

Montana Bald Eagle Nesting Populations and Nest Monitoring, 1980-2014

Final Report



Four bald eagle nestlings ready to fledge from a nest near Missoula, 2011 (Kate Davis Photo)

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Introduction

Bald eagle nesting populations in Montana have been monitored for over 30 years. This report describes the background, purpose, methods, and history of bald eagle nest monitoring in Montana, and summarizes the current status of the nesting bald eagle population.

The bald eagle nesting population in North America and Montana was largely taken for granted until noticeable declines had already taken place. Bald eagle numbers, estimated at a quarter of a million in the lower 48 states before 1800, declined steadily throughout the late 1800s and early 1900s due to illegal shooting and habitat loss. The advent of DDT and related pesticides during World War II and their widespread post-war use soon caused eagle reproduction to plummet. In 1963, a National Audubon Society Survey reported only 417 active nests in the lower 48 states. Bald eagles in the lower 48 states were subsequently listed as Endangered under the Endangered Species Act in 1978.

In 1978 there were 12 known breeding pairs of bald eagles in Montana. A group of biologists initiated annual bald eagle nesting surveys in 1980, and officially started the Montana Bald Eagle Working Group (MBEWG) in 1982. The MBEWG, composed of representatives from federal and state agencies, tribes, universities, conservation groups, and private industry, developed the monitoring methods, data forms, and management recommendations that set the direction for over 30 years of bald eagle recovery and nest monitoring in Montana.

The Montana Bald Eagle Management Plan and addendum (MBEWG 1994, MBEWG 2010) directs management of this species in the state. Specific objectives identified in the plan include: a minimum of 800 nesting pairs in the 7-state Recovery Area that includes Montana; nesting success rate of 65% in occupied sites over a 5-year period with annual average production of 1.0 fledged young per pair; population goals recognized in at least 80% of management zones with nesting potential; and continued population increases for 5 consecutive years. The specific population recovery objective for nesting bald eagles in Montana was 99 nesting pairs, which was reached in 1990.

Bald eagles were down-listed from Endangered to Threatened in 1995, and delisted in 2007. Currently, bald eagles continue to receive protection from the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act. These federal regulations protect eagles from direct persecution and human disturbance that could cause nest abandonment or reproductive failure.

The MBEWG continues to monitor nesting bald eagles across Montana and cooperates with the federal post-delisting monitoring strategy that calls for monitoring every 5 years between 2009 and 2029. The MBEWG developed an updated bald eagle nest monitoring strategy in 2008, to increase monitoring efficiency and better define post-delisting monitoring objectives (MBEWG 2008). The top three objectives of bald eagle nest monitoring were:

1. Track bald eagle nest locations, to facilitate management of bald eagle nesting areas in compliance with the Bald and Golden Eagle Protection Act (BGEPA).
2. Monitor long-term population trends of nesting bald eagles in Montana, in order to ensure the nesting population remains stable or increasing.
3. Monitor nesting production, to identify large-scale production declines or failures that may be indicative of contaminant or other impacts.

Methods

Annual surveys were initiated in 1980, primarily conducted by agency biologists. Over time, a wide variety of agencies and participants helped with monitoring. These included federal, state, and tribal biologists and technicians, private companies such as Plum Creek Timber Company and Avista Corp., private consultants, conservation entities such as Montana Peregrine Institute, various Audubon chapters, Five Valleys Land Trust and the MPG Ranch (private conservation ranch). Many individuals contributed to bald eagle nest monitoring, including birders, anglers, cabin owners, ranchers, private consultants, and students.

The majority of bald eagle nests have been monitored by US Forest Service (USFS), Bureau of Land Management (BLM), US Fish and Wildlife Service (USFWS), National Park Service (NPS), Montana Fish, Wildlife & Parks (MFWP), Montana Department of Natural Resources and Conservation (DNRC), Plum Creek Timber Company, and Confederated Salish and Kootenai Tribes (CSKT). These entities host the majority of the bald eagle nests that are located on public lands and commercial timber lands. Montana Department of Transportation (MDT) is a very important partner for monitoring and managing bald eagle nest sites during highway construction projects. Montana Natural Heritage Program (MNHP) has played a key role in importing nest locations from the bald eagle database, and providing nest locations back to agencies, consultants, and developers for management of bald eagle nest sites.

The CSKT focused a lot of survey and monitoring effort on the Flathead Reservation and Flathead Lake, where a lot of territories were located. Plum Creek Timber Company monitored a large number of territories on and adjacent to their land in NW Montana. Northwestern Energy (formerly Montana Power Company) biologists have assisted greatly with monitoring and other aspects of managing nests.

Bald eagle nest monitoring was originally designed to monitor nesting populations within watershed-based recovery zones that encompassed several western states, including Montana (MBEWG 1994). Those zones (Figure 1) were:

007-- Upper Columbia Basin
018--Greater Yellowstone
038--Missouri Headwaters
039--Upper Missouri
040--Bighorn
041--Powder River
047--Missouri Basin

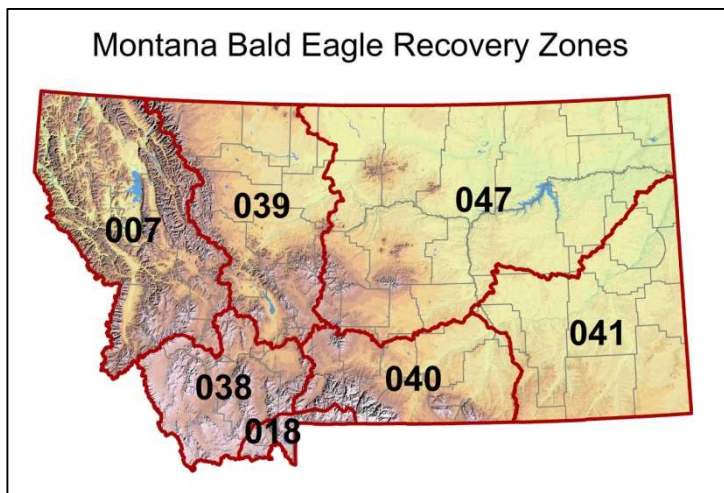


Figure 1. Montana Bald Eagle Recovery Zones.

Monitoring initially focused on the known and historic bald eagle nesting locations and the major areas where they were found, including the major rivers such as the Yellowstone, Missouri, Clark Fork, and

Flathead rivers, and concentrations of major water bodies such as the Flathead and Mission valleys and lakes in Glacier National Park.

As the numbers and geographic distribution of bald eagle nests expanded, the MBEWG encouraged cooperators to expand survey efforts into the smaller tributaries, as funding and time permitted. Effective surveys of new areas usually required the use of aircraft, which was too costly for many agencies. The MBEWG at times discussed the possibility of developing a more spatially-balanced approach to surveys, but choose not to implement such an approach due to the cost and logistics when so many different entities were involved, with varying, often declining budgets and personnel. The Montana bald eagle monitoring strategy remained "list-based" where newly-discovered territories were added to the monitoring list over time.

Annual surveys of a territory were designed to determine the location of the nest site being used and the territory breeding status, including occupancy (is a pair present on the territory?), nesting activity (did the pair lay eggs/attempt to nest?), and nesting outcome (did they fledge young or did the nest fail?). Territories were checked between 1 and 4 times during the nesting season for occupancy (February-March), incubation (March-April), nestlings (April-May) and fledglings (June-July-August). Successful fledging was determined by the presence of large, fully-feathered nestlings in the nest (that would be likely to fledge), or fledglings perched nearby. Nestlings and fledglings were counted when possible. A successful nest was defined by the observation of at least 1 large nestling or fledgling. Poor visibility, lack of ground access, time constraints and other factors resulted in a wide variation in the amount and quality of data collected from each territory.

Initially, most bald eagle territories were monitored every year. As the population increased, monitoring every territory every year became logistically difficult. The MBEWG developed a less intensive post-delisting monitoring strategy in 2008 (Appendix 1) which eased monitoring logistics by recommending each territory be checked a minimum of once every three years, rather than every year.

Annual survey results were collected and entered into a database maintained by Montana Fish, Wildlife & Parks. Nest locations from the bald eagle database were imported into the Montana Natural Heritage Program database, usually on an annual basis.

Bald eagles are highly territorial, and they often have more than one nest site present within their territory. They tend to use the same nest site or group of nests over long periods of time. When nests are lost due to wind or loss of the nesting tree, bald eagles usually rebuild within the same area as long as suitable nest trees remain. Old nest sites that are no longer used by eagles can persist for many years, and are protected under the BGEPA. Knowledge of where active and alternate nests are located has been a critical component of monitoring in Montana.

MFWP produced short annual summary reports for the MBEWG, describing the current known population size and nest production by zone and statewide. Population trends were used to inform the delisting process. Montana's "list-based" monitoring was used by USFWS during their 2009 nationwide "plot-based" monitoring effort (report not yet available as of April 2016).

Once in the MNHP database system, nest locations were used to inform "quarter-quarter latilong" maps on the Montana Animal Field Guide that is available to the public (<http://fieldguide.mt.gov/speciesDetail.aspx?elcode=ABNKC10010>). Nest locations also inform the Montana Bird Distribution project that produces an updated publication every few years detailing the distribution and nesting status of birds in Montana (Montana Bird Distribution Committee 2012). Nest point

locations provided to agency and tribal biologists aid in management activities including preparation of environmental assessments and development of mitigation strategies to reduce impacts of human activities on nesting pairs. Point locations are available to other individuals only through a mediated request process, to protect nest sites from commercial exploitation, disturbance or vandalism.

Definitions in this report follow the Montana Bald Eagle Management Plan (MBEWG1994). Territories with a pair of bald eagles present are considered to be occupied, whether or not nesting takes place, and active if the pair attempts to nest (evidenced by observed presence of eggs, an incubating adult, or nestlings). New bald eagle pairs have often been observed to build and maintain a nest, but not actually lay eggs for the first 1-3 years of occupancy. Some established pairs occasionally skip a year and do not lay eggs, even though they attend a nest. Nests with partly-grown nestlings were defined as "active" but not considered successful unless a subsequent visit confirmed survival of at least 1 nestling to fledging age.

Some additional definitions were used for this report, to describe the number of known territories. Over time, some territories appeared to be abandoned, and the MBEWG debated how to handle territories where no birds were observed for a period of years. The generally accepted standard for defining a "current" territory has been a territory that was occupied during the previous 5 years, to help account for lack of enough survey effort in some years to see birds that are present, or find alternate nest sites. However, the MBEWG decided to use a standard of 7 years, rather than 5, to account for the difficulty in observing some territories and the lower intensity of monitoring. Therefore, a "current" territory as counted in this report included any territory that had been occupied in the previous 7 years. If no birds were observed after 7 years, the territory was considered "historic-abandoned."

The bald eagle database had several old "historic" territories that were rumored to be present in the early 1980's, but never verified by follow-up monitoring. There were a few other territories where birds were observed near a nest structure, but nesting was never verified. These territories were classified as "historic-unverified" territories for this report.

Several territories were not monitored for a period exceeding 7 years, but were occupied territories when they were last checked. These territories, considered "status unknown" included some on private land that are not visible from a public viewing point, several others that are difficult to access, and at least one territory where the birds were suspected to have moved into an area without ground access and built in habitat where their nest was not visible from the air. These territories were not considered "current" unless a subsequent monitoring visit confirmed they were still occupied, even though they are likely still there.

The MNHP database also has a number of bald eagle nest observations that do not match any of our monitored nests. Some, but not all of these were added into the nest database maintained by FWP. Lack of personnel and time prevented us from verifying all bald eagle nest observations reported by unaffiliated individuals. Some of these "bald eagle" nests reported to MNHP may be other species, so verification is needed before they can be added as a bald eagle territory. For example, several nests reported to be on cliffs may actually have been golden eagle nests with partly-grown nestlings (which can resemble bald eagles from a distance with white down on the head and brown wing feathers). However, most of these unverified bald eagle nests were likely bald eagles, so the number of "current" territories in this report probably underestimates the actual nesting population. New bald eagle territories and nests continue to be discovered each year. This report only covers through 2014.

Results

In 1980, Montana had 31 known or suspected bald eagle territories (Table 1). Biologists were able to monitor 23 of those territories, and found 17 active nests. Twenty-six young were fledged that year.

Over the next 34 years, the bald eagle nesting population steadily increased, except in 1987 when the number of known nests declined slightly after a large, strong storm had blown out a significant number of nests the preceding year (Figure 2). Flath et. al. (1991) calculated the bald eagle nesting population grew at an average rate of 14.5% annually between 1980 and 1990. The population is currently over 700 nesting pairs (Table 1, Figure 2). Although part of the observed increase may have been due to searching for and discovering previously unknown nests, most of the increase in documented territories was from an actual increase in the bald eagle nesting population.

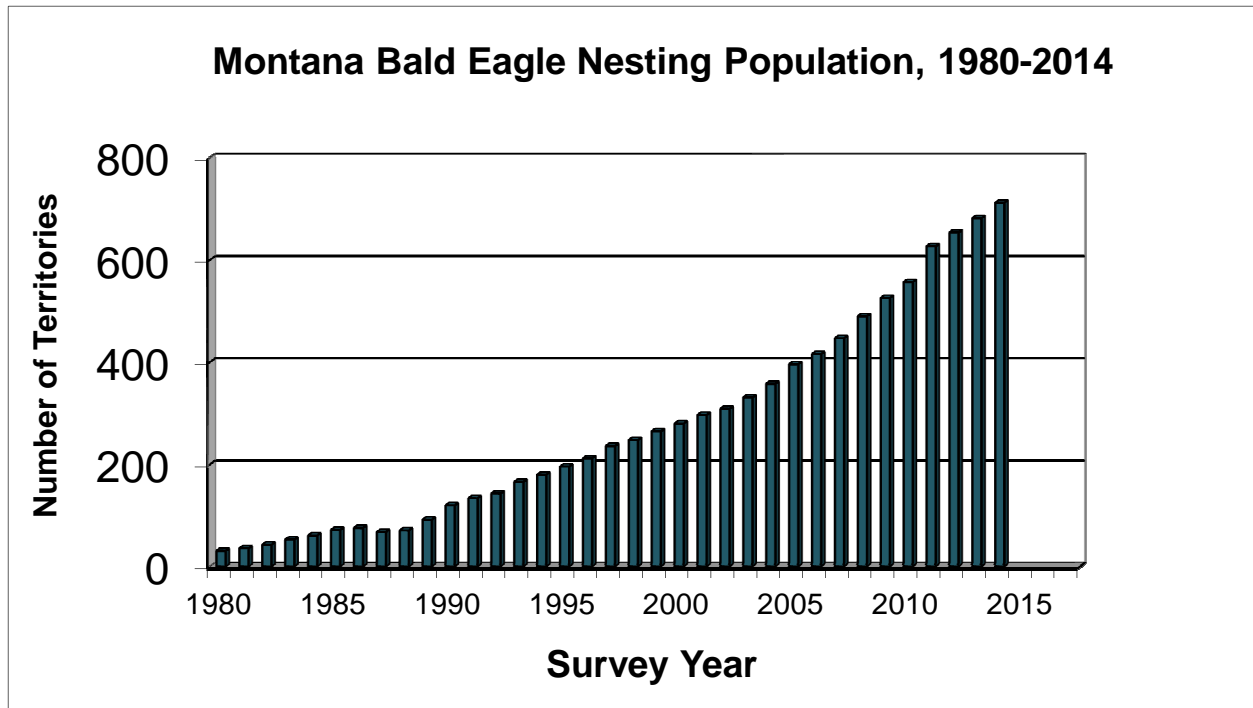


Figure 2. Montana bald eagle nesting population, 1980-2014.

In concert with the population increase, the number of territories monitored also increased (Table 1). Over time, the proportion of territories monitored each year decreased as the amount of effort needed to "keep up" with the population expansion increased. In spite of this, at least 60% of known territories were checked each year through 2014, with over 80% of known territories checked in most years.

During the 34 years of monitoring, bald eagle nest success (Table 1 and Figure 3) ranged from 63 to 85 percent. Nest success was remarkably consistent over the years, mostly varying between 75 and 80 percent.

The average brood size at fledging ranged from 1.5 to 2 young per successful nest (Table 1 and Figure 4). Average brood size appeared to have declined somewhat since 2000, possibly due to more eagles competing for resources on the landscape. The number fledged per territory is more difficult to determine due to the

large number of nests that are not monitored for the complete nesting season. This was estimated for 2000 through 2014 by dividing the total number of fledglings by the number of known-fate nests (including both successful and unsuccessful nests). The number fledged per nesting pair was also quite consistent, ranging from 1.3 to 1.5 fledged young per nesting pair.

Montana bald eagle pairs most commonly fledge 2 nestlings per nesting attempt, though broods of 1 and 3 nestlings are common (Table 2). Over the years, six nesting attempts from six different pairs of bald eagles have fledged 4 nestlings, which is highly unusual (see cover photo). Larger brood sizes at fledging are indicative of healthy birds occupying territories with excellent food resources.

Nesting bald eagles are currently well distributed across Montana, occupying all of the major rivers and most tributaries (Figure 5). The Milk River drainage in northeastern Montana is the only major tributary that generally lacks nesting bald eagles. Nesting bald eagles are also generally absent from the area along the Missouri River surrounding Fort Peck Reservoir. Additional survey effort will verify whether nesting bald eagles are actually absent from these areas, or present but previously undetected.

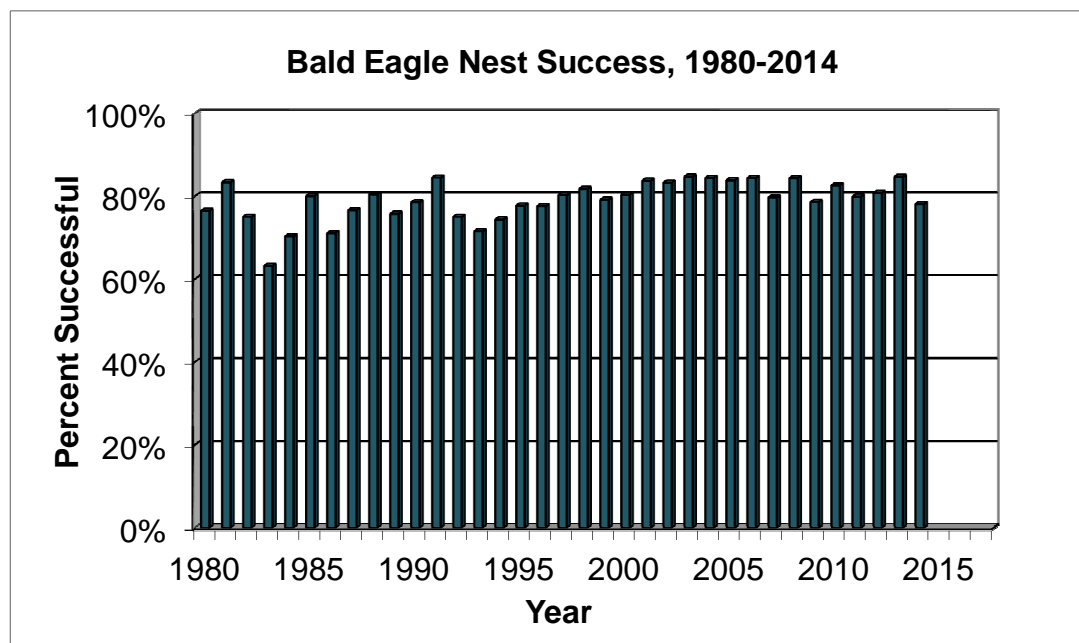


Figure 3. Bald eagle nesting success, 1980-2014.

Roughly 40% of Montana's bald eagle territories are in the Upper Columbia River Basin, Zone 007 (Table 3 and Figure 5). The Yellowstone River and the Missouri River in zones 038 and 039 also support high numbers of nesting bald eagles.

These three major river systems supported the original remnant bald eagle population in the 1970's and 1980's, and the population expanded out from these core nesting areas as populations recovered. Nest locations over the decades as the population expanded are depicted in Appendix 2.

Table 1. Bald eagle territory monitoring data for Montana, 1980-2014, including the observed number of active and successful nests, and observed number of fledglings.

Year	Total Territories	Territories Monitored	Percent Monitored	Active Nests	Successful Nests	Observed Fledged	Nest Success	Average Brood Size	Known Fate Nest Brood Size
1980	31	23	74%	17	13	26	76%	2.00	
1981	36	30	83%	24	20	39	83%	1.95	
1982	43	34	79%	28	21	38	75%	1.81	
1983	53	48	91%	38	24	50	63%	2.08	
1984	61	53	87%	37	26	45	70%	1.73	
1985	72	47	65%	35	28	46	80%	1.64	
1986	76	58	76%	38	27	43	71%	1.59	
1987	68	63	93%	47	36	68	77%	1.89	
1988	71	57	80%	46	37	74	80%	2.00	
1989	92	86	93%	70	53	96	76%	1.81	
1990	120	109	91%	93	73	130	78%	1.78	
1991	134	133	99%	103	87	155	84%	1.78	
1992	143	140	98%	124	93	143	75%	1.54	
1993	166	162	98%	144	103	176	72%	1.71	
1994	180	176	98%	156	116	229	74%	1.97	
1995	196	192	98%	166	129	236	78%	1.83	
1996	212	197	93%	165	128	217	78%	1.70	
1997	236	223	94%	187	150	269	80%	1.79	
1998	248	227	92%	197	161	285	82%	1.77	
1999	265	254	96%	225	178	332	79%	1.87	
2000	280	258	92%	229	180	347	80%	1.93	1.5
2001	297	284	96%	240	190	347	84%	1.83	1.5
2002	309	244	79%	207	164	303	83%	1.85	1.5
2003	331	310	94%	265	210	357	85%	1.70	1.4
2004	358	348	97%	283	227	405	84%	1.78	1.5
2005	396	375	95%	319	238	438	84%	1.84	1.5
2006	416	401	96%	364	281	504	84%	1.79	1.5
2007	447	375	84%	320	180	301	80%	1.67	1.3
2008	490	414	84%	345	248	428	84%	1.73	1.5
2009	526	436	83%	383	161	276	79%	1.71	1.3
2010	557	446	80%	374	232	417	83%	1.80	1.5
2011	627	439	70%	382	198	330	80%	1.67	1.3
2012	654	438	67%	369	172	278	81%	1.62	1.3
2013	682	406	60%	334	138	211	85%	1.53	1.3
2014	713	462	65%	376	199	324	78%	1.63	1.3

Active Nest = Observed nests/territories where nesting was verified based on presence of eggs or nestlings.

Successful Nest = Observed nests/territories where at least 1 young fledged.

Observed Fledged = Observed number of nestlings fledged from known-fate nests.

Nest Success = Percentage of known-fate nests that fledge young.

Average Brood Size = Average number of young fledged per successful nest.

Known Fate Nest Brood Size = Average number of young fledged per known-fate nest, only calculated since 2000.

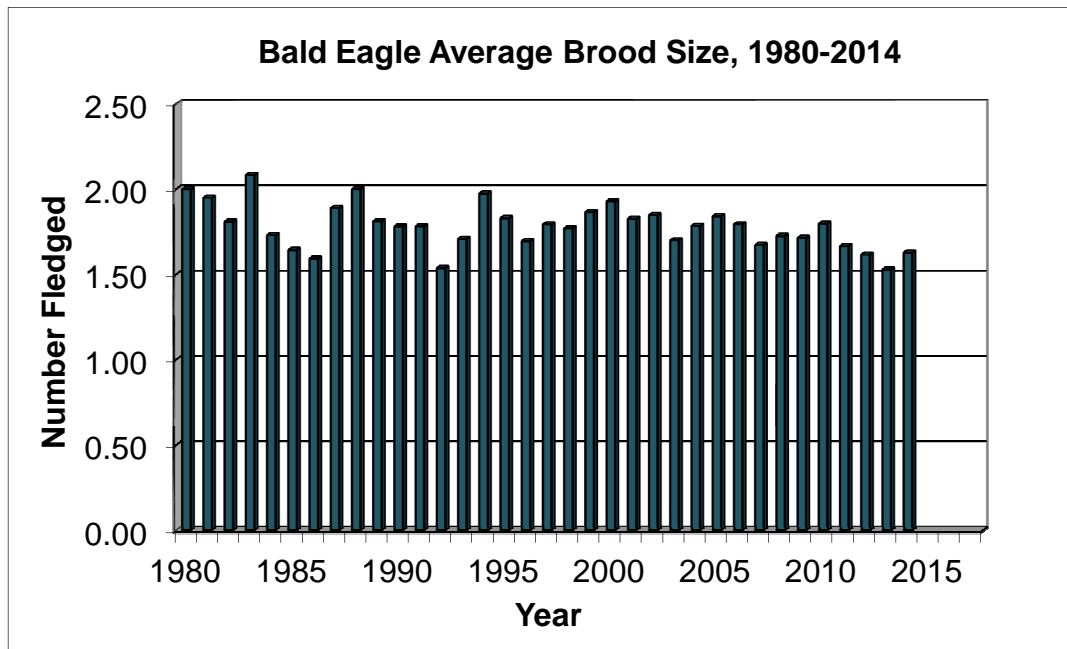


Figure 4. Bald eagle average brood size at fledging, 1980-2014.

Table 2. Number of successful nesting attempts fledging 1, 2, 3, or 4 young by zone, all years.

Zone	1 Fledged	2 Fledged	3 Fledged	4 Fledged	Total
007	998	1284	241	2	2525
018	110	114	16	0	240
038	143	188	48	0	379
039	166	250	109	0	525
040	115	207	98	1	421
041	128	196	103	2	429
047	28	45	11	1	85
Total	1688	2284	626	6	4604
Percent	36.7%	49.6%	13.6%	0.1%	100.0%

Yellowstone National Park and the areas surrounding it (Zone 18) also supported a few of the original bald eagle territories from the 1980s. Bald eagle populations have not expanded as much in this area, likely because of harsh weather conditions and more limited potential nesting habitat. The Greater Yellowstone Ecosystem may have retained a higher proportion of its historic nesting bald eagle population to begin with, possibly due to less exposure to pesticide contamination in the large, mostly pristine headwaters protected there. This would result in a lower observed expansion rate than other zones, as the population was less depressed to begin with.

Distribution of Bald Eagle Nests in Montana, 1980-2014.

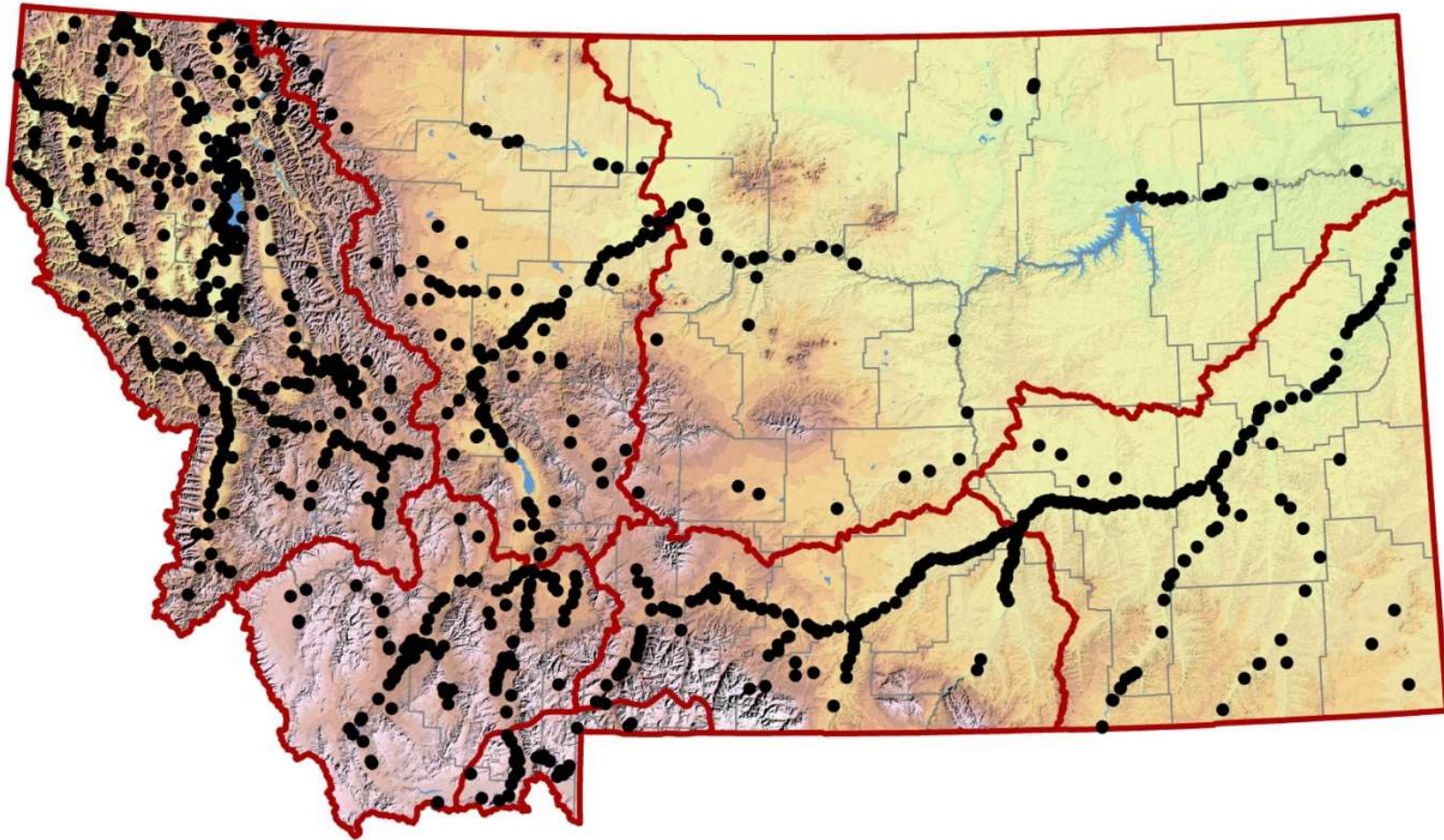


Figure 5. Distribution of bald eagle nests in Montana, including all historic and current territories as of 2014.

In recent years, nesting bald eagles have been found in areas previously considered marginal habitat, such as the Powder River Basin in southeastern Montana. Development of smaller reservoirs that support fish may help support eagle populations in parts of eastern Montana that were previously unsuitable habitat. On the other hand, development of Fort Peck Reservoir eliminated riparian nesting habitat along a large stretch of the Missouri River. Fort Peck Reservoir does not seem to support many nesting bald eagles, in spite of availability of ponderosa pine trees for nesting. Fisheries resources in Fort Peck Reservoir may not offer the same value to bald eagles as river fisheries in the adjacent Missouri River.

Table 3. Distribution of Montana bald eagle territories by eagle monitoring zone, as of 2014.

Zone	Total	Current	Historic- Abandoned	Historic- Unverified	Status Unknown
007	319	304	7		8
018	26	17	4		5
038	80	75	2	1	2
039	102	98	3		1
040	94	87	4	3	
041	97	93			4
047	42	39	1		2
Statewide	760	713	21	4	22

Nesting bald eagles are found in 51 out of Montana's 56 counties (Table 4). Note that the number of territories by county adds up to more than the statewide number of territories due to territories that have nest sites in more than one county. Of the five counties that lack bald eagle nests, Petroleum, Pondera and Silver Bow counties have nests just outside the county boundaries along the Musselshell, Marias and Big Hole Rivers. Many county boundaries follow rivers, where bald eagle nesting territories straddle boundaries. Hill County currently lacks known nests, but supports nesting habitat (and likely undocumented bald eagle nests) along the Milk River. Only Daniels and Sheridan counties in northeastern Montana lack major rivers or streams, yet they still have some suitable nesting habitat for bald eagles. It is likely that bald eagle nesting will be documented in every Montana county, if populations continue to expand. The top six counties supporting the highest number of bald eagle territories are Flathead, Lincoln, Madison, Missoula, Powell, and Lake which collectively support over a third of Montana's bald eagle nesting population.

Montana FWP regions 1 and 2 support the highest numbers of bald eagle territories (Table 5), however significant numbers of territories are found in several other FWP regions.

Most of the territories occupied in 1980 are still occupied, though some went through periods of un-occupancy or lack of monitoring. Around a dozen territories have been continuously occupied since 1980. Notable territories in this elite group include Horse Butte near Hegben Lake which has been continuously occupied since 1977, and Sperry Grade east of Missoula and Bull Island on Flathead Lake, both of which have been continuously occupied since 1979. Nests that persist for many years can become quite large in size. The Avon-Snowshoe nest, continuously occupied since 1993 has become enormous (Figure 6).

Table 4. Numbers of territories and nests by county.

County	Territories	Nests
Beaverhead	26	44
Big Horn	13	28
Blaine	1	1
Broadwater	8	11
Carbon	13	20
Carter	3	3
Cascade	32	54
Chouteau	27	36
Custer	20	43
Dawson	11	13
Deer Lodge	1	4
Fallon	1	1
Fergus	6	7
Flathead	64	125
Gallatin	32	57
Garfield	1	1
Glacier	6	12
Golden Valley	1	1
Granite	16	25
Jefferson	5	8
Judith Basin	1	1
Lake	37	71
Lewis and Clark	30	58
Liberty	2	3
Lincoln	56	108
Madison	45	80
McCone	4	6
Meagher	6	8
Mineral	10	14
Missoula	39	84
Musselshell	3	4
Park	21	33
Phillips	4	5
Powder River	9	11
Powell	38	67
Prairie	7	10
Ravalli	24	42
Richland	7	7
Roosevelt	4	5
Rosebud	27	47
Sanders	37	52
Stillwater	12	22
Sweetgrass	12	23
Teton	5	5
Toole	4	4
Treasure	13	37
Valley	5	6
Wheatland	2	2
Wibaux	1	1
Yellowstone	30	70

Table 5. Bald eagle territories and nests by Montana FWP region.

FWP Region	Territories	Nests
1	187	346
2	127	236
3	145	265
4	104	156
5	74	145
6	22	31
7	110	201

More interesting is the re-occupancy of some historic bald eagle territories, including one near Frenchman Reservoir in northeastern Montana. This territory was described in the files as *"This was a valid territory, active until 1965, not checked after that. Nest persisted into early 1970s."* This territory was re-occupied in 2013 after 48 years of vacancy, in spite of being relatively isolated from the nearest occupied bald eagle nesting areas along the Missouri River.

Many bald eagle pairs in Montana have had more than one nest site (Table 6). Many pairs have built nests sequentially, only building a new nest after losing a nest to wind or tree fall. Others have several nests within their territories that they alternate between in different years. Some have abandoned a nest site after many years of use, and moved to a new nest site for no apparent reason. In most cases, bald eagles will build a new nest in or close to the cluster of old nest sites within their territory. The general locations of former nest sites, even after they are gone, is a good predictor of where a bald eagle pair will build new nests in the future. This is important to consider when managing disturbance around nesting areas where the pair has lost its current nest site and a replacement nest has not yet been located.



Figure 6. Avon-Snowshoe bald eagle nest, 2015.

Table 6. Total number of nest sites per territory documented for nesting bald eagles in Montana.

Nests per territory	Number of Territories
1 Nest	434
2 Nests	160
3 Nests	91
4 Nests	43
5 Nests	16
6 Nests	11
7 Nests	5

Land ownership for bald eagle nests was not analyzed for this report due to incomplete information in the database and uncertainty in accurately mapping nest sites that are close to property boundaries. However it is clear that private landowners host a significant proportion of bald eagle nests in Montana. This was also the case in 1990, when 42% of known bald eagle nests were on private lands. A significant proportion of nests are found on federal, state, and tribal lands.

Bald eagles in Montana have used a variety of tree species and types for nesting (Table 7). Cottonwood trees of any species are commonly used, even in areas where conifer trees are available. This may be due to their proximity to large water bodies, though the architecture of the tree branches is also an important factor for supporting large eagle nests. Many conifer trees, while large, may not have large, open branches where eagles can readily perch and build nests. No bald eagle nests have been documented on cliffs in Montana.

Large "legacy" conifer trees that rise above the surrounding forest canopy can provide important nesting and roosting sites for bald eagles in the forested regions of western Montana. On the other hand, cottonwood trees provide the only suitable nesting substrate across most the Great Plains of eastern Montana. Bald eagles often select the larger trees in a stand for nesting. In western Montana, bald eagles tend to select larger stands of trees for nesting, and the taller, larger trees within the stand. Most bald eagle nests are within 2000 feet of the associated water body (MBEWG 1991, MBEWG 1994, Wright and Escano 1986). However, some bald eagles have used large, isolated trees for nesting, surrounded by grasslands or agricultural lands in both eastern and western Montana.

In recent years, bald eagles have used osprey nests on power poles and platforms for nesting (Figure 7). Not reflected in this table is a bald eagle nest found on a cell tower near Billings in 2015. These nests on poles and platforms have not persisted as well as natural nest sites, and create management issues due to the requirement of a permit under the Bald and Golden Eagle Protection Act to move or remove a nest.



Figure 7. Bald eagle nests on former osprey nest sites, including a power pole near St. Regis (left) and an osprey nest platform in the Bighole (right). Photos by Kristi DuBois and Kate Stone.

Table 7. Nest supports documented for bald eagle nests in Montana.

Nest Support	Total Nests	Reported as Dead/Snag
<u>Broadleaf Tree:</u>	588	22
Aspen	4	
Cottonwood	584	22
<u>Conifer Tree:</u>	288	43
Douglas-fir	57	11
Engleman Spruce	2	
Lodgepole Pine	4	1
Ponderosa pine	179	21
Western Larch	17	2
Western White Pine	2	
Unidentified Conifer	27	8
Unidentified Tree Snag	5	5
Platforms/Artificial Supports	4	
Osprey Nest Platform/Power Pole	3	
Platform in Cottonwood	1	
Nest Support Not Reported	495	
Total Nests	1380	70

Discussion

The population expansion of nesting bald eagles in Montana from 1980 through 2014 provides an amazing success story for wildlife management. As of 2014, the population continues to expand and shows little sign of leveling off. It is anticipated that the Montana bald eagle nesting population will eventually reach carrying capacity, and expansion will wane. The carrying capacity for nesting bald eagles in Montana remains unknown, however some observations indicate the population may be approaching carrying capacity, as evidenced for example by occupation of areas once considered to be marginal habitat.

Historic populations of bald eagles in Montana were not documented prior to population crashes from poaching and pesticide contamination. Flath et al. (1991) provides a good summary of historic information on nesting bald eagles.

Brood sizes have declined slightly in recent years. This could be an indication of greater strife between adjacent nesting pairs of eagles as the population increases. It could also be biased due to fewer nests monitored for production in recent years from the highly productive Yellowstone River area, as agency budgets for flights have declined. Significant drops in production that could indicate reproductive problems

from environmental contaminants has not been observed in Montana. The USFWS post-delisting monitoring plan (USFWS 2009) primarily focuses on monitoring the number of occupied territories, and does not include a component for monitoring nesting productivity.

The high numbers of nesting bald eagles in Montana makes it too difficult and expensive to monitor each territory every year for activity and production. As bald eagles have become fairly common across the landscape, agency resources are being redirected to other species that are more rare or suffering population declines. Yet some level of bald eagle production monitoring is desirable to ensure that any new threats, including contaminants and disease are detected early so that management actions can be taken before populations suffer serious declines.

Bald eagle nests are relatively easy to find and monitor. Some of this monitoring can be done by interested birders, landowners, and other interested volunteers. However, volunteer monitoring is ineffective without a high level of coordination to ensure the data is gathered, properly formatted, and submitted to MNHP. Agency cooperators need to place a high priority on submitting their nest monitoring data, including incidental nest observations into the MNHP in a timely manner. A high priority for monitoring is documenting new bald eagle nest sites, so they can be properly managed to avoid take under BGEPA. New nest sites should receive the highest priority for data submission. Keeping nest site data within the agency, rather than the MNHP makes it difficult to quickly get essential data into the hands of other agencies or developers who need to evaluate impacts of their management actions on bald eagle nesting.

No matter how complete we consider the bald eagle nesting layer to be, eagle nest sites will change over time. All who propose projects and developments should employ qualified biologists to do pre-project surveys for nesting eagles and not rely solely on the MNHP database.

Maintaining suitable nesting habitat, including mature trees will be critical for maintaining a healthy bald eagle population. Cottonwood stands are declining in extent along some rivers in eastern Montana where the natural hydrology has been disrupted by dams. Maintaining natural, healthy cottonwood stands over the long-term will be key to maintaining bald eagle nesting populations in areas of eastern Montana that lack conifer trees or other nest sites. Nesting platforms should not be considered a substitute for natural bald eagle nesting habitat. Management of fisheries resources and other food sources is critical for bald eagles and other fish-eating raptors. Reducing lead contamination in the environment from lead sinkers and bullet fragments is essential to maintain good survival of adult eagles.

Continued management of habitats for bald eagles and their prey, and keeping the environment clean and free from contaminants will be the key to maintaining nesting eagles on Montana's landscape for decades to come. Thanks to on-going monitoring and management efforts for nesting bald eagles in Montana, the future for this species looks good.

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Appendix 1. Montana bald eagle nest monitoring strategy developed by the MBEWG.

Montana Bald Eagle Nest/Production Monitoring Strategy

April 2, 2008

This monitoring strategy was developed by the Montana Bald Eagle Working Group (MBEWG) to address several issues and concerns related to bald eagle nest monitoring. Increasing numbers of bald eagle territories, declining agency budgets, or redirection of species priorities are making it difficult to monitor every territory every year. This strategy was developed to provide some guidance for prioritizing monitoring efforts to be more efficient, while gathering enough data to adequately manage bald eagles and monitor population trends.

The MBEWG considered production to be an important indicator of bald eagle population health. The U.S. Fish and Wildlife Service (USFWS) post-delisting monitoring is conducted once every 5 years, and looks at occupancy, but not production. Their sampling is based on randomly-selected survey plots that are searched, regardless of whether bald eagle nests are documented in those survey plots. Monitoring by randomly-selected areas provides a more spatially-balanced picture of bald eagle occupancy. The USFWS encourages states to continue list-based monitoring, as an important component of overall bald eagle monitoring and management.

Monitoring objectives are:

1. Track bald eagle nest locations, to facilitate management of bald eagle nesting areas in compliance with the Bald and Golden Eagle Protection Act (BGPA).
2. Monitor long-term population trends of nesting bald eagles in Montana, in order to ensure the nesting population remains stable or increasing.
3. Monitor nesting production, to identify large-scale production declines or failures that may be indicative of contaminant or other impacts.
4. Maintain “list frame” monitoring, to compliment nationwide plot based monitoring efforts conducted by the USFWS as part of post-delisting monitoring efforts.
5. Monitor specific nests or territories for which management recommendations have been made, to evaluate effectiveness of the management recommendations.

The MBEWG recognizes that annual monitoring of every known territory is desirable, but unattainable. Guidance that allowed agency flexibility was desirable. Montana bald eagle nesting success and production has been relatively consistent over the years, with little variability. A monitoring strategy that allows managing agencies to select nests and areas to monitor was preferred over a strategy that requires extensive planning, such as randomly selecting territories to be monitored. Consultation with a statistician (Justin Gude) indicated that random selection of territories was probably not necessary.

Management of bald eagle nesting areas played a large role in determining monitoring effort. The USFWS considers an active bald eagle territory or nest to be any that has been occupied or active within the past 5 years (although some managing agencies consider 7 years as a more appropriate time frame). Monitoring only once every 5 years would not provide enough information to determine territory status with any degree of confidence. A three-year period was chosen as a compromise between desirable versus attainable monitoring levels.

Past monitoring efforts have produced a large and valuable database on nesting bald eagles in Montana. Some territories have been monitored for over 25 years. Continued monitoring of some of these territories is desirable to maintain the data string.

The following monitoring strategies are recommended, to accomplish the objectives:

1. At minimum, monitor any individual territory once every three years (or monitor at least a third of the territories each year) for occupancy and activity.
2. Monitor a smaller portion of active territories to determine outcome (successful/unsuccessful) and nestling production. We estimated that around 10% of territories statewide would be sufficient to get an estimate of production, as long as they were well distributed among the different zones.
3. Continue to document new territories, and new nest sites in existing territories for management purposes.
4. Try to monitor territories that are easy to monitor every year (continuing data strings for some of our territories that have a long monitoring history). These are generally ones that are easily visible from roads.
5. Agencies and tribes who can monitor all territories each year within their jurisdiction are encouraged to do so.
6. Monitor territories and/or nests that are under threat from human impacts for production. Examples would include nests in or near new subdivisions, timber sales, or other activities that represent a change from the previous levels of human activity around that nest.
7. Montana FWP will continue to maintain the bald eagle nest database in the foreseeable future.

Bald Eagle Monitoring Terms

Occupied-Unknown Outcome: A pair of bald eagles were present in the territory during the nesting season, but the nest was not observed or located, or the nest was not checked sufficiently to confirm a nesting attempt.

Occupied-No Production: A pair of bald eagles were present during the nesting season, but no eggs were laid (this often happens for the first 1-3 years of a new bald eagle territory). Eagles were observed building or attending a nest, but no incubation behavior was observed.

Unoccupied-no eagles were observed on the territory, no nests were active. It's helpful to know if the territory was checked only once, or several times during the nesting season, to determine that a territory is unoccupied.

Active: The bald eagles have attempted to nest, as evidenced by incubation behavior, brooding behavior, or observations of eggs or nestlings.

Active-Unknown outcome: Nesting was observed (incubation, eggs, or downy nestlings observed), but the nest wasn't checked late enough in the season to verify fledglings or large nestlings.

Inactive: Usually refers to a nest site that is vacant or empty when checked.

Successful: The nesting attempt resulted in fledged nestlings, or large fully-feathered nestlings in the nest that were likely to fledge.

Unsuccessful: The territory was active, eggs were laid, but the nesting attempt failed and nothing fledged.

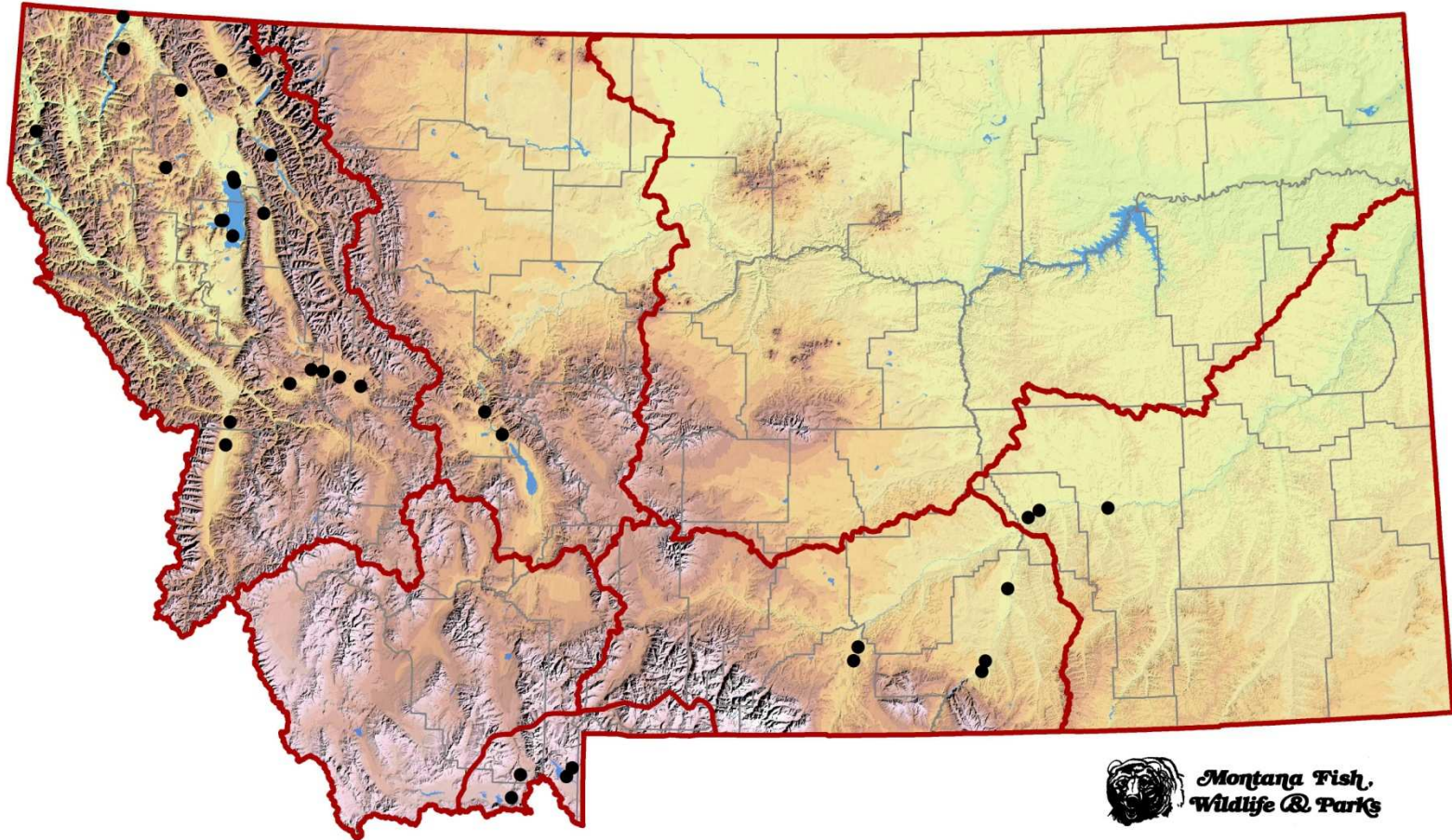
Single adult: A single adult eagle was observed on the territory, but no mate or nesting activity were observed.

Other species: Another species is using the known bald eagle nest (often a Canada goose, osprey, or red-tailed hawk), and no other bald eagle nests are observed in the territory.

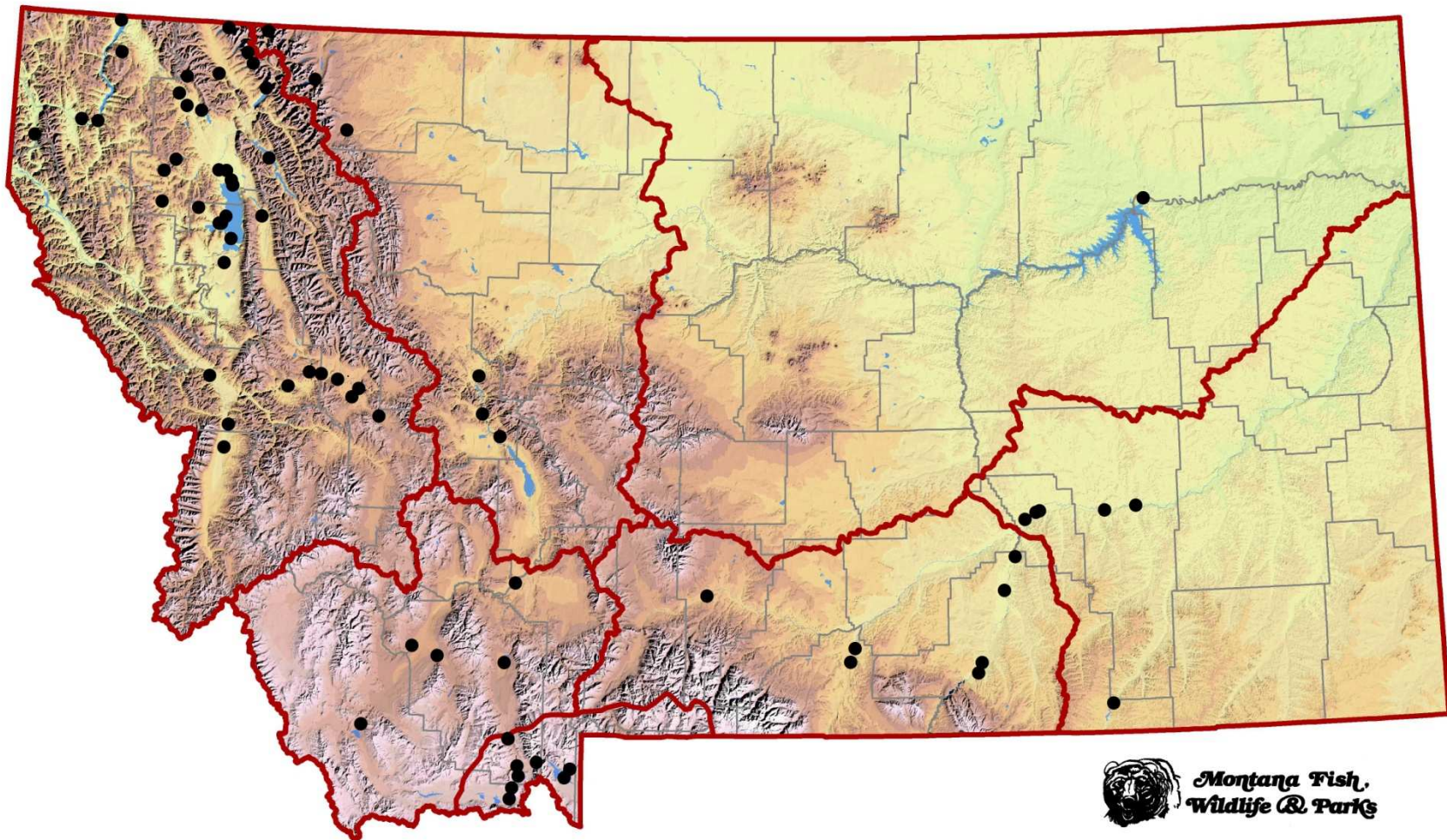
Unknown: the territory wasn't checked that year, or it was checked only briefly, and the nest could not be found or observed.

Appendix 2. Distribution of bald eagle nests in Montana, 1980 to 2014.

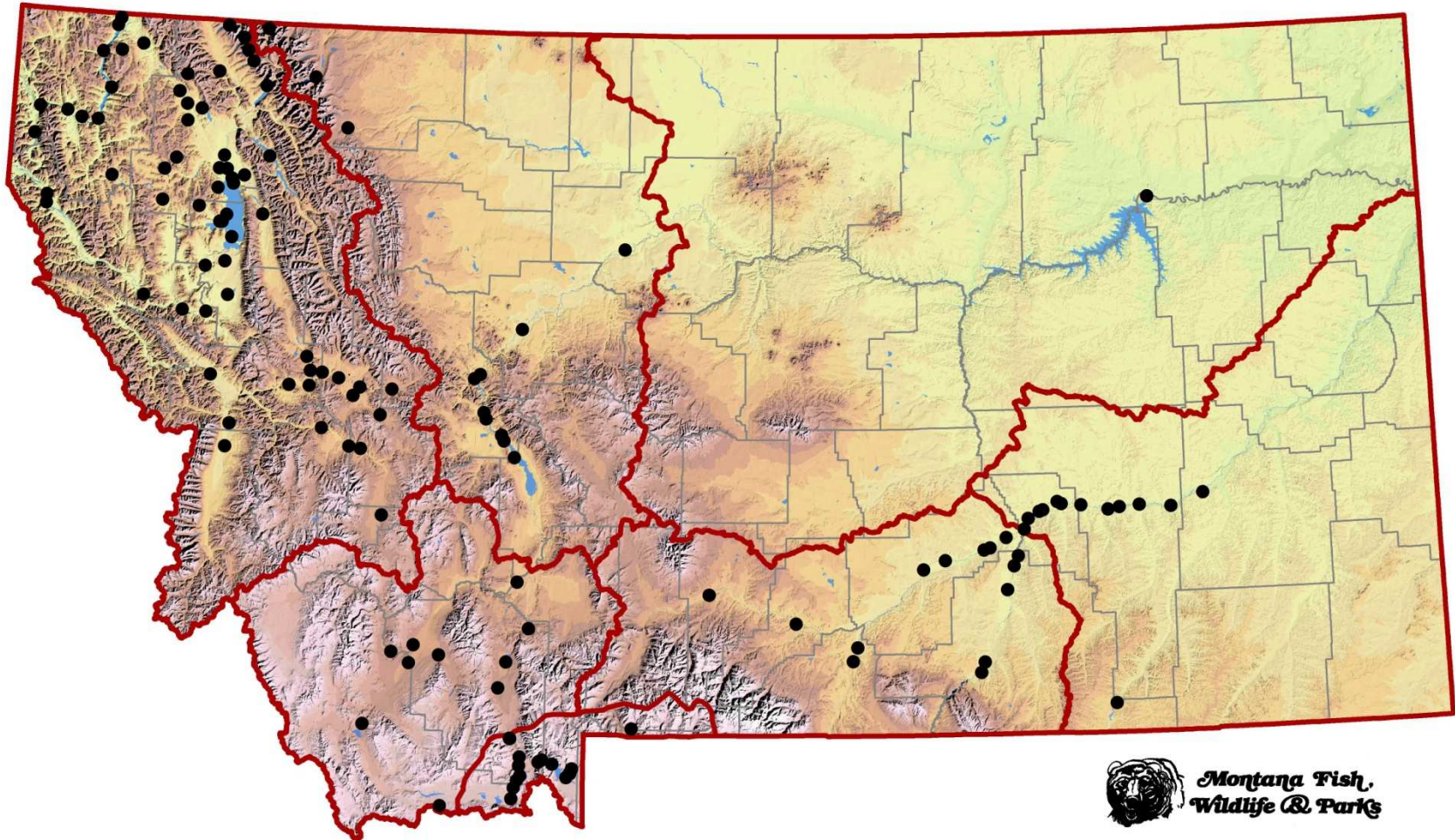
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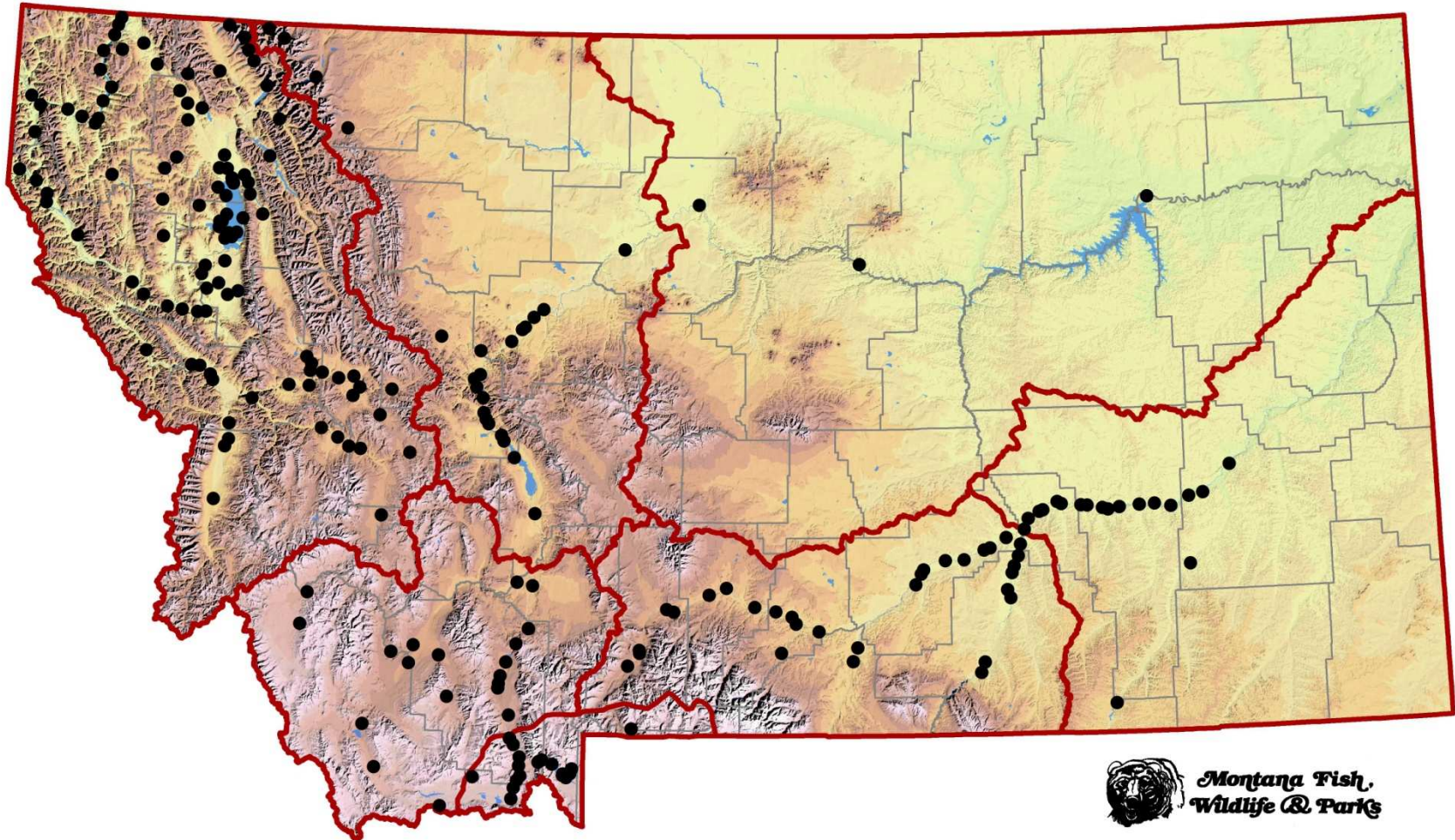
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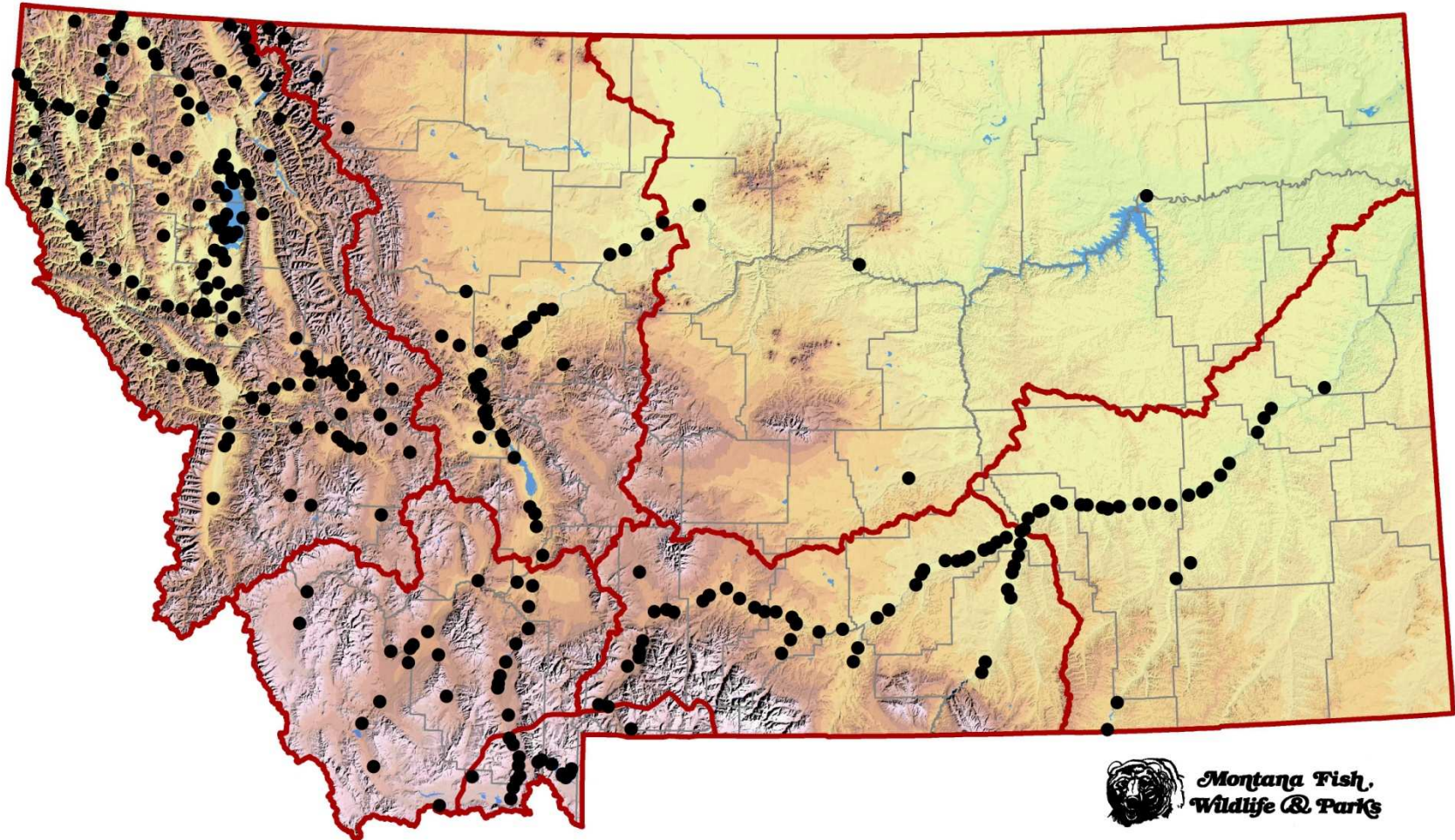
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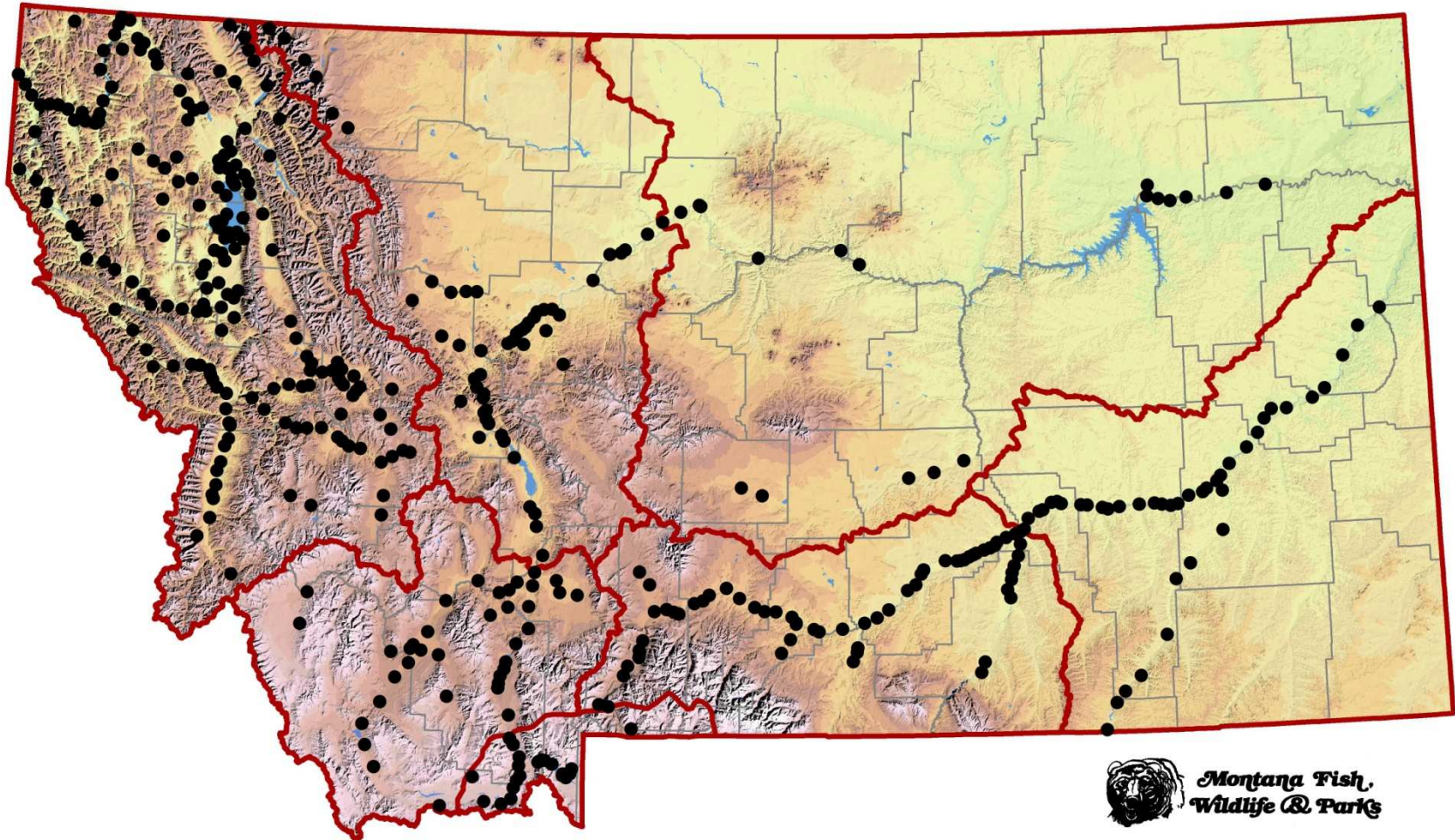
Montana Bald Eagle Territories, 1995



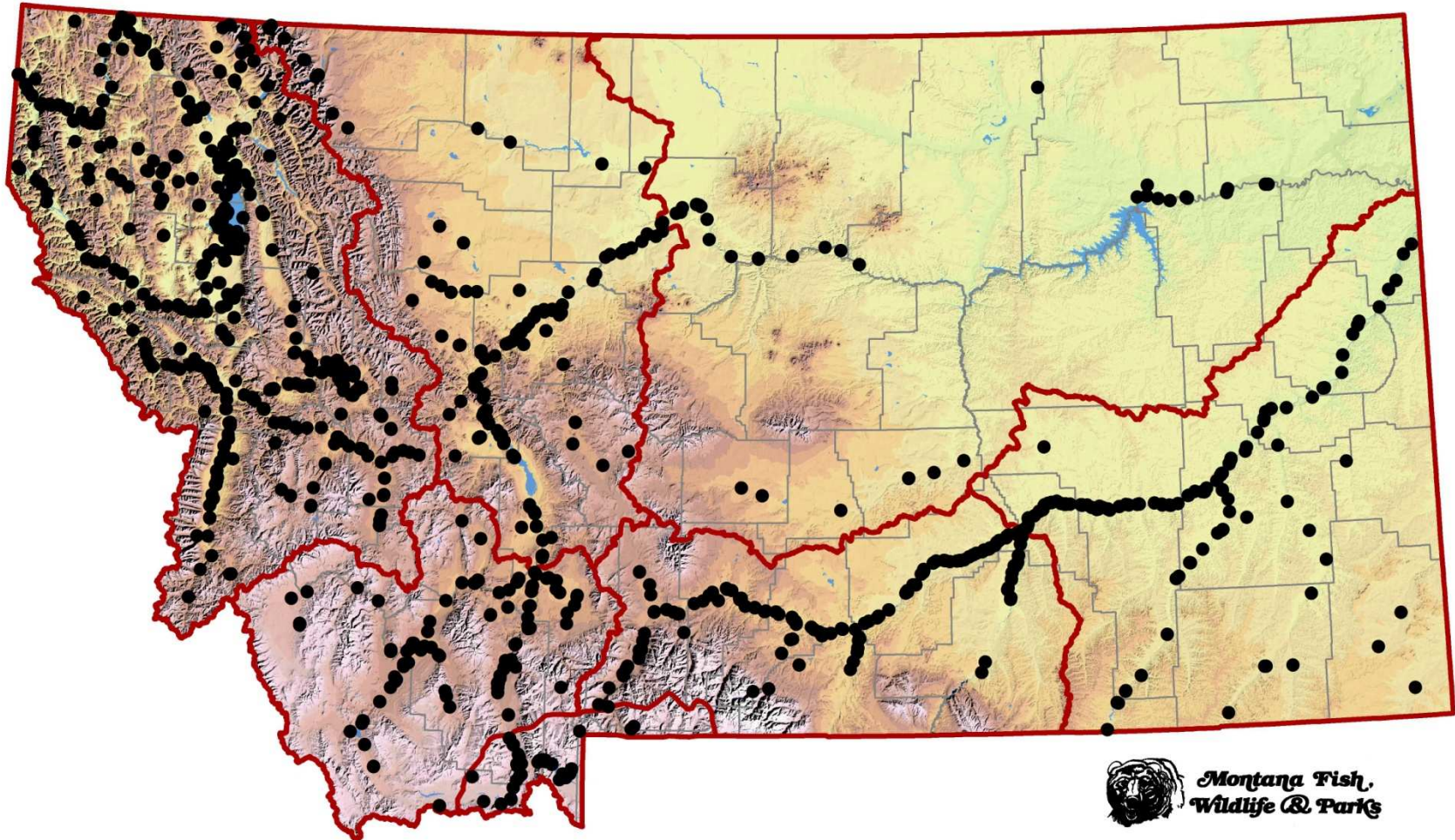
Montana Bald Eagle Territories, 2000



Montana Bald Eagle Territories, 2005



Montana Bald Eagle Territories, 2010



Montana Bald Eagle Territories, 2014

